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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,804	06/12/2006	Kiyotaka Matsuda	KOD177B.001APC	6973

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EXAMINER	
MOMPER, ANNA M	

ART UNIT	PAPER NUMBER
3657	

NOTIFICATION DATE	DELIVERY MODE
09/01/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/595,804	MATSUDA ET AL.	
	Examiner	Art Unit	
	ANNA MOMPER	3657	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 August 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-12 and 14-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-12, 14-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Amendment to the claims received 8/05/2010 has been entered. Claims 1 and 10 have been amended.

Response to Arguments

2. Applicant's arguments with respect to the rejection under 103 with regards to Nakajima have been considered but are moot in view of the new ground(s) of rejection.

3. Applicant's arguments filed 8/05/2010 have been fully considered but they are not persuasive.

4. Applicant argues that the tires of Umezawa are for heavy duty pneumatic tires and that tires are not subject to constant shape changes as a belt does and does not provide analogous art for combining. The examiner disagrees and feels that tires and belts and analogous art as both applications use an elastomeric material embedded with reinforcement cords which are used to strengthen, reinforce and distribute forces in both applications. The examiner maintains that while the end product art is different, that one of ordinary skill in the art would understand the reinforcement cords taught by Umezawa which provide strength in the tires, would provide a similar benefit in application such as a belt.

5. As per the arguments with regards to the irregularities and the irregularities generating friction and resistance against sliding of the belt relative to a pulley, the examiner maintains that while not explicitly disclosed by the reference, as the irregularities are a product of the combination of elements, that where in combination,

the prior art discloses the elements of the invention, the resulting element (the irregularities) would be present.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 2-12, and 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto (JP 56-159143 A) in view of Fujita (US 6,216,853) and Kimura (JP 10-184808 A) and Ueda et al. ("Noise and Life of Helical Timing Belt Drives") and Osako et al. (US 6,220,983 B1).

As per claim 2-3 and 10-11, Sakamoto discloses a belt comprising:

a back layer (Fig. 5);

teeth (8) configured to be engaged with a pulley; and

core cords (3) embedded between the back layer and the teeth and aligned in the longitudinal direction of the belt for reinforcing the belt (Fig. 5), and no canvas is

formed on the helical teeth nor on a surface between the helical teeth (Fig. 5), wherein the belt is created by wrapping the core cords (3) around and in contact with a cylindrical mold (2) having female helical teeth (1) and injecting a raw material (5) into a cavity between the cylindrical mold and an outer cylinder mold (4) enclosing the cylindrical mold (Fig. 2).

Sakamoto discloses the belt being formed of a belt molding raw material (abstract) but is silent as to what material is used.

Fujita discloses a toothed belt (1) having a body (1A) and teeth (2) being made from urethane resin (Col. 4, Ln. 17-24).

It would have been obvious to one having ordinary skill in the art at the time the invention to modify the belt of Sakamoto to make the back layer and teeth of the belt made of urethane resin, as taught by Fujita, for increasing thermal and strength properties. Also note In re Leshin, 125 USPQ 416, and that it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Sakamoto fails to explicitly disclose the teeth being helical and substantially all of the core cords are twisted at an angle opposing to an angle of helical teeth.

Kimura discloses a belt (1) having helical teeth with a helical tooth angle formed by a tooth inclination line of each helical tooth and a line perpendicular to a longitudinal direction of the belt (α) and core cords (2), and wherein all of the core cords are twisted in a single direction at a twist angle which is formed by a twist inclination line of each core cord and a line parallel to a longitudinal direction of the core cords (β),

wherein a direction of the tooth inclination line and a direction of the twist inclination line are opposite to each other with respect to the line perpendicular to the longitudinal direction of the belt, at (Fig. 2, core cords are twisted using an S-twist or Z-twist such that all wires are twisted in the same direction, and wherein the angle of twist of the core cords is opposing an angle of inclination 10a of the helical teeth).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the belt of Sakamoto to include helical teeth and the core cords being twisted at an angle opposite the angle of the helical teeth, as taught by Kimura, for the purpose of reducing noise and vibrations.

Modified Sakamoto fails to explicitly disclose a helical tooth angle set between 5° and 15° (claim 2 and 10) or more specifically, a tooth angle of 10°, 7°, or 5° (claim 3 and 11) wherein the helical tooth angle is an angle formed by a tooth inclination line of each helical tooth and a line perpendicular to a longitudinal direction of the belt.

Ueda et al. discloses a helical synchronous belt having core cords (Pg. 274, "2. Forms and Dimensions of Test Belts and Pulleys", Ln. 4-5) and a helical tooth angle set to 3, 5 or 10° (Pg. 274, "2. Forms and Dimensions of Test Belts and Pulleys", Ln. 5-8).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the belt of Modified Sakamoto to include the helical tooth angle set between 5° or 10°, as taught by Ueda et al. for the purpose of reducing noise.

Modified Sakamoto fails to explicitly disclose a core cord twist angle set to 15° to 2° (Claim 2 and 10), or more specifically 10.2° or 4.8°(claim 3 and 11).

Osako et al discloses a belt for power transmission wherein the belt comprises a plurality of reinforcement cords (24) and wherein said cords are obtained by twisting a plurality of filaments (36) to form strands (40) and wherein the plurality of strands are then twisted to form the reinforcement cords (24) and wherein the final diameter of the cords (24) is between 1.1 and 1.5 mm and wherein the strands are twisted from 5-10 twists/10 cm, and wherein the twist corresponds to an angle of twist taken from a line parallel to the longitudinal direction of the belt and cords to be between 2.8 and 8.5 degrees (discloses the diameter as being 1.1-1.5mm or .0011-.0015 m, and a twist rate of 5-10 twists/10cm which is equivalent to 50-100 twists/m and inversely becomes 0.02-0.01 m/twist, and wherein a triangle can be drawn using the m/twist measurement as a height and the diameter as the length, and wherein the tangent of the triangle can be taken to determine the angle of twist to be 2.86-8.53).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the belt of Modified Sakamoto to include a core cord twist angle set between 15° to 2°, as taught by Osako et al. for the purpose of providing a balance between strength and flexibility of the belt. Modified Sakamoto fails to explicitly disclose the core cord twist angle being 10.2° or 4.8°, however it would have been obvious to optimize the angle of the core cord twist angle since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

As per claims 4, 6 and 12, Ueda et al. further discloses the core cords being made of glass fiber (Pg. 274, "2. Forms and Dimensions of Test Belts and Pulleys", Ln. 4-5).

As per claims 5 and 7, Ueda et al. also discloses the use of the helical synchronous belt in a driving carriage (Pg. 274, "1. Introduction", Ln. 1-3).

As per claims 8 and 9, Ueda et al. also discloses the use of the helical synchronous belt in a driving carriage (Pg. 274, "1. Introduction", Ln. 1-3).

As per claims 17-18, Modified Sakamoto discloses the belt being adapted to move back and forth a carriage of a printer or copier (capable for the use of providing motion to a carriage of a printer or copier).

9. Claims 2-12, and 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto (JP 56-159143 A) in view of Fujita (US 6,216,853) and Kimura (JP 10-184808 A) and Ueda et al. ("Noise and Life of Helical Timing Belt Drives") and Umezawa (US 5,520,233).

As per claim 2-3 and 10-11, Sakamoto discloses a belt comprising:

a back layer (Fig. 5);

teeth (8) configured to be engaged with a pulley; and

core cords (3) embedded between the back layer and the teeth and aligned in the longitudinal direction of the belt for reinforcing the belt (Fig. 5), and no canvas is formed on the helical teeth nor on a surface between the helical teeth (Fig. 5), wherein the belt is created by wrapping the core cords (3) around and in contact with a cylindrical mold (2) having female helical teeth (1) and injecting a raw material (5) into a

cavity between the cylindrical mold and an outer cylinder mold (4) enclosing the cylindrical mold (Fig. 2).

Sakamoto discloses the belt being formed of a belt molding raw material (abstract) but is silent as to what material is used.

Fujita discloses a toothed belt (1) having a body (1A) and teeth (2) being made from urethane resin (Col. 4, Ln. 17-24).

It would have been obvious to one having ordinary skill in the art at the time the invention to modify the belt of Sakamoto to make the back layer and teeth of the belt made of urethane resin, as taught by Fujita, for increasing thermal and strength properties. Also note In re Leshin, 125 USPQ 416, and that it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Sakamoto fails to explicitly disclose the teeth being helical and substantially all of the core cords are twisted at an angle opposing to an angle of helical teeth.

Kimura discloses a belt (1) having helical teeth with a helical tooth angle formed by a tooth inclination line of each helical tooth and a line perpendicular to a longitudinal direction of the belt (α) and core cords (2), and wherein all of the core cords are twisted in a single direction at a twist angle which is formed by a twist inclination line of each core cord and a line parallel to a longitudinal direction of the core cords (β),

wherein a direction of the tooth inclination line and a direction of the twist inclination line are opposite to each other with respect to the line perpendicular to the longitudinal direction of the belt, at (Fig. 2, core cords are twisted using an S-twist or Z-

twist such that all wires are twisted in the same direction, and wherein the angle of twist of the core cords is opposing an angle of inclination 10a of the helical teeth).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the belt of Sakamoto to include helical teeth and the core cords being twisted at an angle opposite the angle of the helical teeth, as taught by Kimura, for the purpose of reducing noise and vibrations.

Modified Sakamoto fails to explicitly disclose a helical tooth angle set between 5° and 15° (claim 2 and 10) or more specifically, a tooth angle of 10°, 7°, or 5° (claim 3 and 11) wherein the helical tooth angle is an angle formed by a tooth inclination line of each helical tooth and a line perpendicular to a longitudinal direction of the belt.

Ueda et al. discloses a helical synchronous belt having core cords (Pg. 274, "2. Forms and Dimensions of Test Belts and Pulleys", Ln. 4-5) and a helical tooth angle set to 3, 5 or 10° (Pg. 274, "2. Forms and Dimensions of Test Belts and Pulleys", Ln. 5-8).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the belt of Modified Sakamoto to include the helical tooth angle set between 5° or 10°, as taught by Ueda et al. for the purpose of reducing noise.

Modified Sakamoto fails to explicitly disclose a core cord twist angle set to 15° to 2° (Claim 2 and 10), or more specifically 10.2° or 4.8°(claim 3 and 11).

Umezawa discloses a tire having a plurality of reinforcement cords and wherein the tensile rigidity of the belt can be improved by changing the twisting angle of the filament in the cord (Col. 7, Ln. 46-54) and wherein conventionally angles of 8-10 degrees are used (Col. 6, Ln. 18-25) and wherein the twisting angle can be reduced by

lengthening the twisting pitch whereby the tensile modulus of the cord is raised to improve the tensile rigidity of the belt and having a twisting angle of 3 to 6 degrees (Col. 7, Ln. 65-Col. 8, Ln. 8).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the belt of Modified Sakamoto to include a core cord twist angle set between 15° to 2°, as taught by Umezawa for the purpose of providing a balance between strength and flexibility of the belt. Modified Sakamoto fails to explicitly disclose the core cord twist angle being 10.2° or 4.8°, however it would have been obvious to optimize the angle of the core cord twist angle since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

As per claims 4, 6 and 12, Ueda et al. further discloses the core cords being made of glass fiber (Pg. 274, "2. Forms and Dimensions of Test Belts and Pulleys", Ln. 4-5).

As per claims 5 and 7, Ueda et al. also discloses the use of the helical synchronous belt in a driving carriage (Pg. 274, "1. Introduction", Ln. 1-3).

As per claims 8 and 9, Ueda et al. also discloses the use of the helical synchronous belt in a driving carriage (Pg. 274, "1. Introduction", Ln. 1-3).

As per claims 17-18, Modified Sakamoto discloses the belt being adapted to move back and forth a carriage of a printer or copier (capable for the use of providing motion to a carriage of a printer or copier).

10. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto (JP 56-159143 A) in view of Fujita (US 6,216,853) and Kimura (JP 10-184808 A) and Ueda et al. ("Noise and Life of Helical Timing Belt Drives") and Umezawa (US 5,520,233) and further in view of Onoe et al. (US 4,790,802).

As per claims 14-16, Modified Sakamoto fails to explicitly disclose the core cords being made with aramid fibers.

Onoe et al. discloses a belt (1) having reinforcement cords (6) having and angle of twist and wherein the reinforcement cords may be made from aramid fibers (Col. 3, Ln. 52-54).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the belt of Modified Sakamoto to make the core cords out of aramid fibers, as taught by Onoe et al., for the purpose of providing a balance between strength, flexibility and weight. Further, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

11. Claims 2-12, and 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakamoto (JP 56-159143 A) in view of Fujita (US 6,216,853) and Kimura (JP 10-184808 A) and Ueda et al. ("Noise and Life of Helical Timing Belt Drives") and Nakajima et al. (JP 5-312237) and further in view of Onoe et al. (US 4,790,802).

As per claims 14-16, Modified Sakamoto fails to explicitly disclose the core cords being made with aramid fibers.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANNA MOMPER whose telephone number is (571)270-5788. The examiner can normally be reached on M-F 6:00-3:30 (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Siconolfi can be reached on (571) 272-7124. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

am

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